Course alpha, number, title: ME 442 Turbomachinery

Required or elective: Elective

Course (catalog) description: Applying energy, momentum, and continuity equations of thermo-fluids to turbomachinery. Blade geometry and aerodynamics. Performance and design parameters. Turbomachine design.

Prerequisite(s): (ME 332)

Textbook(s) and/or other required material: S.L. Dixon, "Fluid mechanics and Thermodynamics of Turbomachinery", Butterworth-Heinemann Pub.

Class/Lab schedule: Total Credits: 3 Lecture/Laboratory/Discussion Hours: 3/0/0

Topics covered:
- a. Continuity & Momentum Equation
- b. Energy Equation
- c. Centrifugal Pumps
- d. Blade Geometry
- e. Performance Parameters
- f. Velocity Triangles
- g. Design Procedures
- h. Water Turbines
  - i. Wind Turbines
- j. One D Compressible Flow
- k. Centrifugal Compressor
- l. Axial Flow Gas Turbine

Course learning objectives: To provide students with the understanding of the thermo-fluids theory dealing with energy transfer and transformation in turbomachines, and to develop basic analysis and design experience.

Relationship of course to ME program outcomes:
The following measurement standard is used to evaluate the relationship between the course outcomes and the educational-program outcomes:
- 2 = Strong Emphasis, 1 = Some Emphasis, 0 = Little or No Emphasis.
- (a) an ability to apply knowledge of mathematics, science, and engineering—2
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data—0
- (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability—1
- (d) an ability to function on multidisciplinary teams—1
- (e) an ability to identify, formulate, and solve engineering problems—1
- (f) an understanding of professional and ethical responsibility—1
- (g) an ability to communicate effectively—1
- (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context—0
- (i) a recognition of the need for and the ability to engage in life-long learning—0
- (j) a knowledge of contemporary issues—0
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice—1

Contribution to:
- 55% Engineering Science
- 45% Engineering Design
professional component:

Person(s) who prepared this description: Norbert Mueller and Abraham Engeda

Date of Preparation: 2010, updated 2014